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09/766,069	01/19/2001	James R. Kahn	353-05	8301

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9  
EXAMINER

MERCADO, JULIAN A

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 09/23/2003

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 9

Application Number: 09/766,069  
Filing Date: January 19, 2001  
Appellant(s): KAHN ET AL.

Dean P. Edmundson  
For Appellant

**EXAMINER'S ANSWER**

**MAILED**  
SEP 23 2003  
**GROUP 1700**

This is in response to the appeal brief filed July 7, 2003.

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**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

This appeal involves claims 1-17.

Claims 14-17, drawn to a method, are herein allowed, pursuant to the April 25, 2003 decision of the BPAI in which the rejection of method claim 9 in parent application Serial No. 09/471,662 was reversed.

Claims 1-13, drawn to an apparatus, are maintained rejected for the reasons of record.

**(4) *Status of Amendments After Final***

No amendment after final has been filed.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) *Grouping of Claims***

Appellant's brief includes a statement that claims 1-17 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

**(8) *Claims Appealed***

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The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) Prior Art of Record**

4,376,688	CEASAR et al.	3-1983
5,914,018	FU et al.	6-1999
4,108,751	KING	8-1978
5,492,605	PINARBASI	2-1996
4,693,805	QUAZI	9-1987
5,423,971	ARNOLD et al.	5,423,971

CSC Technical Note, "Ion Beam Neutralization", pp. 4, 5 and 11

**(10) Grounds of Rejection**

a. At the outset, pursuant to the April 25, 2003 decision of the BPAI in parent application Serial No. 09/471,662, in which the rejection of method claim 9 in was reversed, the examiner notes that the following rejections have been withdrawn:

- i. The 35 U.S.C. 103(a) rejection of claims 14-16 based on Ceasar et al. (U.S. Pat. 4,376,688) in view of Fu et al. (U.S. Pat. 5,914,018) and as evidenced by King. (U.S. Pat. 4,108,751).
- ii. The 35 U.S.C. 103(a) rejection of claim 17 based on the foregoing and further in view of Pinarbasi. (U.S. Pat. 5,492,605).

Claims 14-17, drawn to a method, are allowable over the prior art of record. The BPAI decision in the parent application sets forth that while Ceasar discloses an ion beam energy of 0 – 2000 eV, Kaufman's supplemental declaration persuasively establishes that the ion beam source used in Ceasar is incapable of operating below about 50 eV:

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Kaufman's interpretation of "one to several thousand volts" as meaning one thousand to several thousand volts is entitled to significant weight since it is his disclosure, and the examiner has provided no evidence or reasoning which shows that Kaufman's interpretation, which is a reasonable interpretation, is correct. Moreover, as discussed above, Kaufman indicates in his declaration (pages 2-3) and supplemental declaration (page 2) that sputtering using the ion source he invented and Ceasar uses is impossible at a beam energy at or below about 50 eV unless the target has a negative bias, and the examiner has provided no evidence or reasoning to the contrary. (BPAI decision, page 8)

As method claims 14-17, which are all independent claims, similarly recite an ion source means having an ion efflux energy of about 50 eV or less and a sputter target biased negative relative to ground, the prior art ground of rejection of claims 14-17 have been withdrawn.

b. The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar et al. (U.S. Pat. 4,376,688) in view of Fu et al. (U.S. Pat. 5,914,018) and as evidenced by King. (U.S. Pat. 4,108,751). This rejection is set forth in prior Office Action, Paper No. 6.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar et al. in view of Fu et al. and as evidenced by King as applied to claims 1-3 and 9 above, and further in view of Pinarbasi. (U.S. Pat. 5,492,605). This rejection is set forth in prior Office Action, Paper No. 6.

Claims 6, 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar in view of Fu et al. and as evidenced by King as applied to claims 1-3 and 9 above, and further in view of Quazi. (U.S. Pat. 4,693,805). This rejection is set forth in prior Office Action, Paper No. 6.

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Claims 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar in view of Fu et al. and as evidenced by King as applied to claims 1-3 and 9 above, and further in view of Arnold et al. (U.S. Pat. 5,423,971). This rejection is set forth in prior Office Action, Paper No. 6.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ceasar in view of Fu et al. and as evidenced by King as applied to claims 1-3 and 9 above, and further in view of Ion Beam Neutralization (Commonwealth Scientific Corporation). This rejection is set forth in prior Office Action, Paper No. 6.

**(11) Response to Argument**

Response to Arguments against the Ceasar et al. Reference, "The Ceasar et al. Reference Does Not Describe an Ion Source Producing Ions of 50 eV or Less":

Appellant submits that the primary reference, that to Ceasar et al., "does not describe use of an ion source which emits ions having an energy of 50 eV or less". (Appeal Brief, page 9) To the extent that *use* of the instant ion source is applicable towards the method-of-using claims (emphasis added), the examiner acquiesces with applicant's assertion consistent with the BPAI decision in the parent application cited above. Method claims 14-17 are now allowed.

However, regarding the apparatus claims and as the BPAI decision sets forth, an ion energy of about 50 eV or less in the apparatus in Ceasar when taken in combination with the teachings of King would indeed be obvious at least to the skilled artisan.

[t]he relevant issue regarding appellant's apparatus claims is not whether the applied prior art would have fairly suggested, to one of ordinary skill in the art, operation of a sputtering apparatus at an ion beam energy of about 50 eV or less but, rather, whether the applied prior art would have fairly suggested, to one of ordinary skill in the art, a sputtering apparatus which is capable of being operated at an ion beam energy of about 50 eV or less. As discussed above, the record indicates that Ceasar's sputtering apparatus, modified to have a negative biased sputter target as suggested by King, would have that capability. (BPAI decision, pages 6-7)

Response to Arguments against the Fu et al. Reference, "Fu et al. Patent Does Not Pertain to An Ion Beam Source":

Appellant submits that Fu et al. is without an ion source which produces an ion beam directed at the target. In reply, the examiner maintains that any alleged deficiencies in Fu et al. does not establish nonobviousness in the presently claimed invention, as the ground of rejection relying on Fu et al. is based on Ceasar as the primary reference. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Fu et al. reference is relied upon to teach or at least suggest the presently claimed sputter target having a curved target surface. Appellant asserts that "the purpose of a shape for the target surface in Fu et al. is to eliminate re-deposition on the target sidewall (col. 2 lines 62-64), whereas in the present invention the shaping is for the purpose of controlling the trajectories of the secondary electrons that are emitted from the target surface". (Appeal Brief, pages 9-10) Thus, it appears to the examiner that Appellant has a different reason for employing a curved target surface as compared to the reasons demonstrated by the prior art. It is maintained that modification of Ceasar's invention by employing a concave or convex target surface would be obvious to the skilled artisan for reasons (as cited by Appellant, *ibid*) such as controlling sputtered target trajectories. Appellant's reason and purpose for employing a curved target surface does not preclude the prior art's teaching and suggestion thereof even if the prior art's reason and purpose is different.

Response to Arguments against the King Reference, "The King Reference Does Not Cure The Deficiencies of Ceasar et al. and Fu et al.":

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Appellant submits that the King reference teaches no practical operation at an ion beam energy in the 50 eV range. To the extent this argument is applicable towards the method-of-using claims, i.e. operation in the 50 eV range, the examiner acquiesces with applicant's assertion consistent with the BPAI decision in the parent application cited above. As above, method claims 14-17 are now allowed.

However, regarding the apparatus claims and as the BPAI decision sets forth, an ion energy of about 50 eV or less in the apparatus in Ceasar when taken in combination with the teachings of King would indeed be obvious at least to the skilled artisan. As to King not teaching the use of a negatively biased target, the examiner's position is consistent with that of the BPAI decision, which sets forth that "King would have fairly suggested, to one of ordinary skill in the art, using a negative biased sputter target in Ceasar's apparatus to obtain increased ion acceleration and energy". (BPAI decision, page 6)

Response to Arguments against the Pinarbasi Reference, "Pinarbasi Does Not Teach Containment of Secondary Electrons":

Appellant sole argument against Pinarbasi is that the patent does not teach the use of a magnetic field near the sputter target. However, the examiner maintains that a magnetic field near the sputter target would be an obvious modification to the skilled artisan for reasons such as increased ionization efficiency and beam uniformity. (Pinarbasi, col. 5 line 15-19)

Response to Arguments against the Quazi Reference, "Quazi Does Not Teach Low Energy Ion Source", against the Arnold et al. Reference, "The Arnold et al. Reference Does Not Teach Use of a Low Energy Source":



Appellant's arguments against Quazi, Arnold et al. and the *Ion Beam Neutralization* Article appear to be directed solely to these references failing to remedy alleged differences between the other cited references and the present claims, specifically, that neither Quazi nor Arnold et al. teach a low energy ion source, i.e. about 50 eV or less. However, as set forth in the related BPAI decision, an ion energy of about 50 eV or less in the apparatus in Ceasar when taken in combination with the teachings of King would indeed be obvious at least to the skilled artisan.

Response to Arguments against the *Ion Beam Neutralization* Article, "The *Ion Beam Neutralization* Article Does Not Cure The Deficiencies of the Other Cited References":

Appellant submits that Ceasar et al. describes the need to confine almost all the ion beam onto the target and that the *Ion Beam Neutralization* Article would not satisfy this requirement, however, the examiner maintains that combination of Ceasar et al. with the *Ion Beam Neutralization* Article would be obvious albeit for a different reason, that is, employing an end-Hall type gridless ion source or hollow cathode would be an obvious modification at least to the skilled artisan for reason such as longer usage lifetimes with a low ion energy voltage. (*Ion Beam Neutralization*, pages 4, 5 and 11)

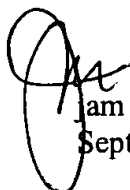
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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,




jam

September 17, 2003

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